For Beautiful Water Environment

Dredging・Bottom Sediment Purification
Project for Environment Improvement

MSC method

Miracle Sludge Clean

Reproduction of water and soil by early aggregation and sedimentation



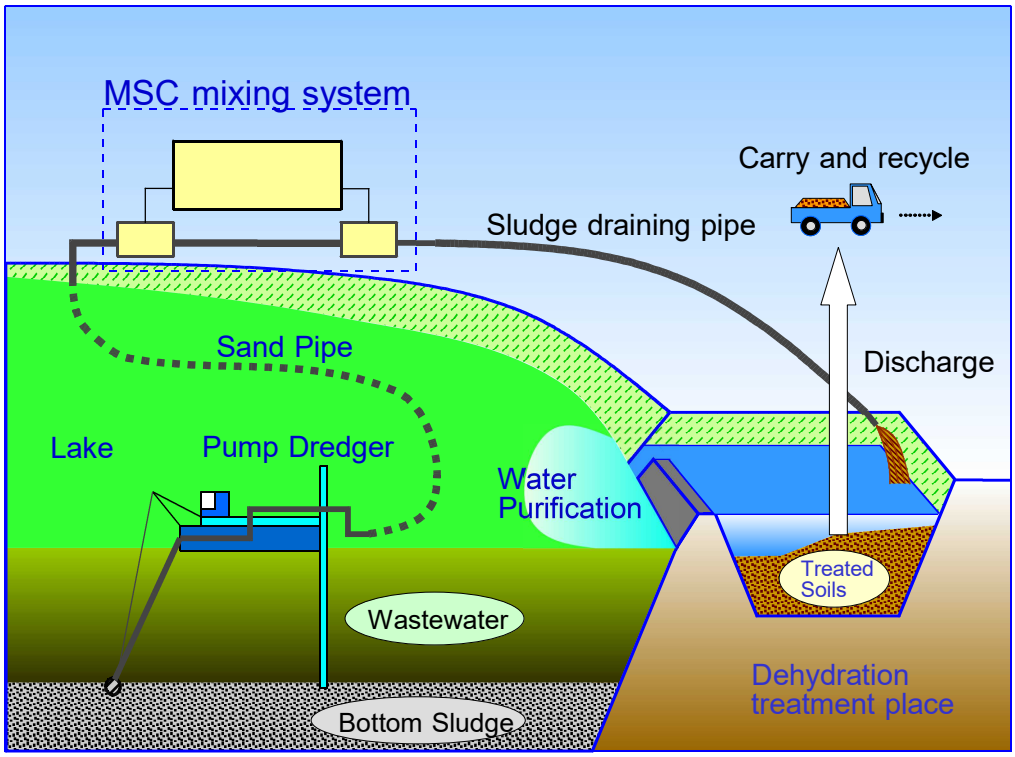



SO-EN CO., LTD

■Sediment sludge and turbid water treatment by the MSC method

Bottom sediment treatment technology with MSC method can quickly and economically improve a large amount of the bottom sediment to good quality soil by its large aggregation capacity and dehydration-separation function. By MSC method, contaminated water environment will improve and bottom sludge will be recycled to rich soil for plant and landfill. Moreover, MSC method can treat waste sludge from wastewater treatment facilities. Thus, MSC largely contributes to water environment improvement.

■Design of pump dredging boat construction



Due to large flocculent and hydrophobing effect of MSC, it doesn't require large agitation hydration facility. Thus, continuous flocculent and hydrophobing of bottom sludge can be conducted in simple facility.

Sludge is mixed by an agitation pump on dredger. High concentration of mud water is sucked by a dredging pump.

Mud water is sent to a treatment plant throught pipes, to correspond with the movement of the dredger, we set up pipes with floats on the water and set up laying metallic pipes on the ground.

■What is MSC method?

MSC stands for "Miracle Sludge Clean." The main contents of MCS are iron salt and metal salt. This inorganic flocculant is composed of rare earth elements.
MSC method is the general term of "bottom sediment treatment and water purification technology with MSC."

■Advantage of MSC method

1. Due to good working property, it can work from small to large amount of treatment.
2. It protects treated water and soils against bad odor, water pollution and the remixing sludge and water.
3. Separated soils can be recycled.
4. It is less likely to produce industrial wastes, as well as it is economical.

■Safety of MSC method

Since it doesn't contain toxic matters, it is safe and harmless to spill stream, organisms in coagulative separated soil, plant, and environment.

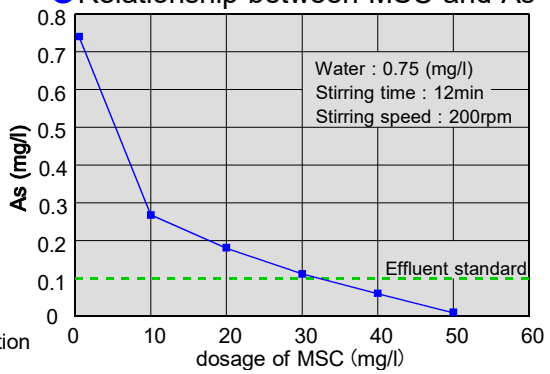
Muddy water which MSC agitated is released to a treatment yard and separates hydrophobicity immediately. There is no offensive odor during construction with the odorless function of MSC .

●Water purification by MSC

Water index	Removal rate
SS	80～99%
COD	50～80%
TN、TP	50～80%
Heavy Metals	50～90%

*The effect depends on water quality and condition

●Relationship between MSC and As



M S C Plant

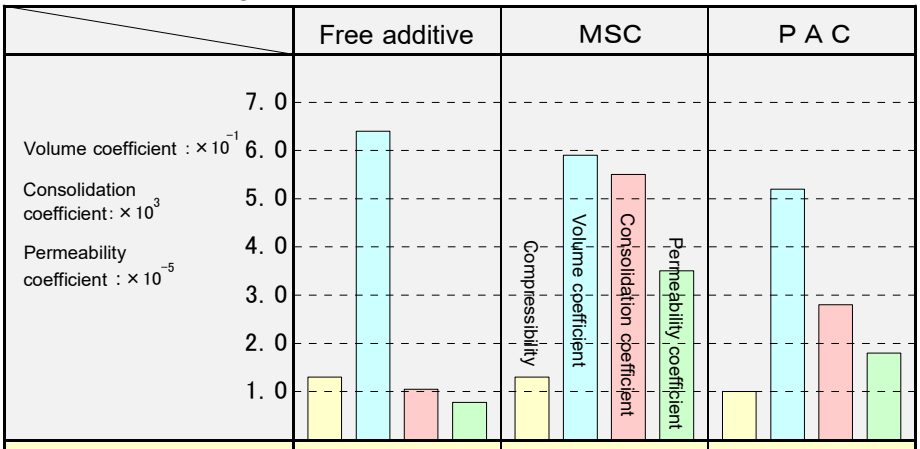
■Comparison with conventional methods

(In the case of water content 4000% in initial stage)

●Consolidation

Comparing MSC with PAC, the coefficient of volume compressibility is approximately 1.3 times.
Coefficients of consolidation and transmissibility are approzimately 1.9 times.

Figure－1　Consolidation comparison



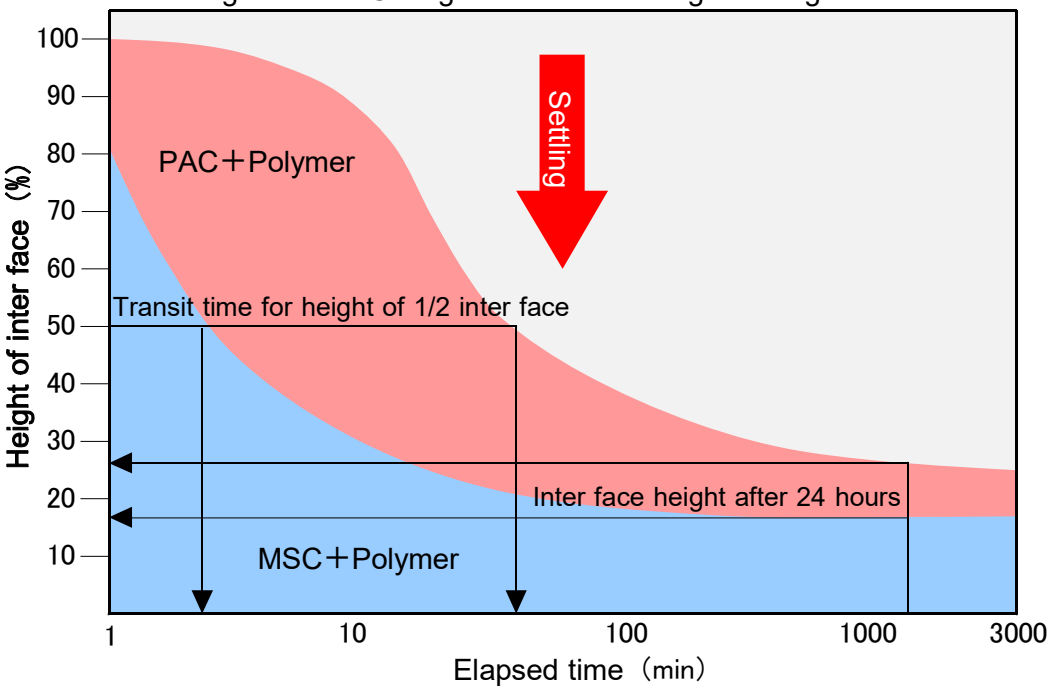
	Free additive	MSC	P A C
Compressibility	1.3	1.3	1.0
Volume coefficient cm^2/kgf	6.4×10^{-1}	6.9×10^{-1}	5.2×10^{-1}
Consolidation coefficient cm^2/d	1.05×10^{3}	5.5×10^{3}	2.8×10^{3}
Permeability coefficient cm/sec	0.78×10^{-5}	3.5×10^{-5}	1.8×10^{-5}

（Consolidation weight : 0.1kgf/cm）

●Sedimentation velocity

Sedimentation time (transit time for height of 1/2 inter face) in the initial stage is shortened 1/15.
Height of inter face after 24 hours is compressed to 16%.
It is compressed by 1/1.7 of the PAC use.

Figure－2　Change of interfacial height through time



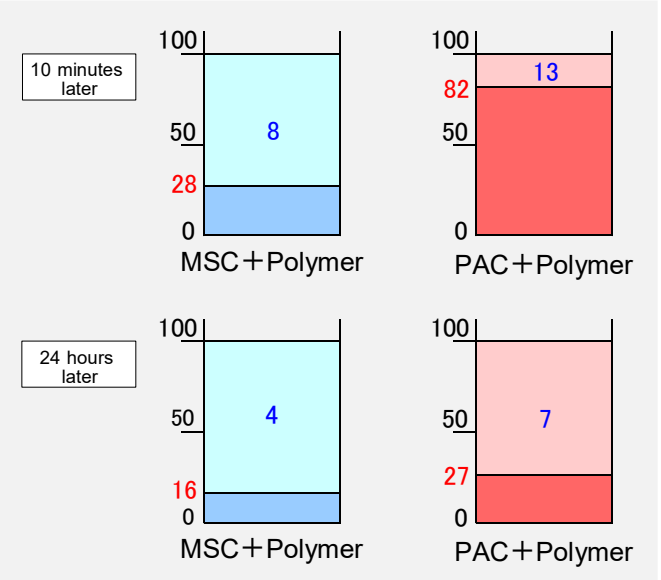
●Water content of coagulative separation soil

Water content of coagulative separation soil is 400－200% (MSC) while it is 700 to 730% (PAC), thus decreasing by approximately 300%.

●Conclusion

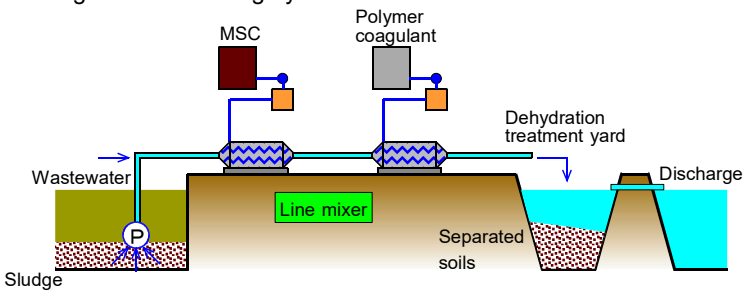
・Sedimentation velocity in the initial stage is fast.
　→ Clarification of spill stream.
・Consolidation coefficient is large
　→ The sediment capacity increases.
・Permeability coefficient is large.
　→ Drainage at soil improvement in a short time.
　The made land can be used sooner.

◆MSC is excellent at consolidation characteristics. Since the initial settlement of dredged soil and self-weight consolidation are quickly completed, the efficiency of consolidation reclamation work improves and large reclaimed land capacity can be obtained.



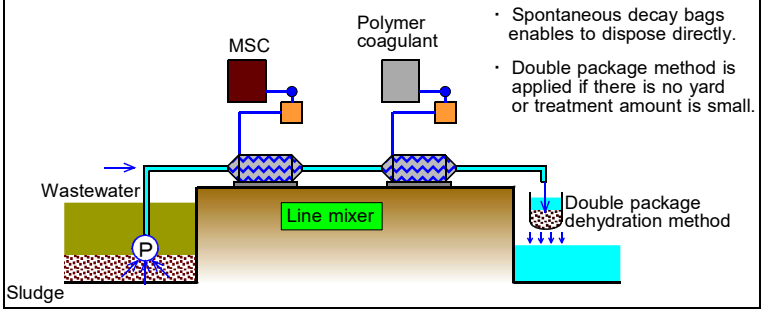
MSC mixing system method

●Design of MSC mixing system

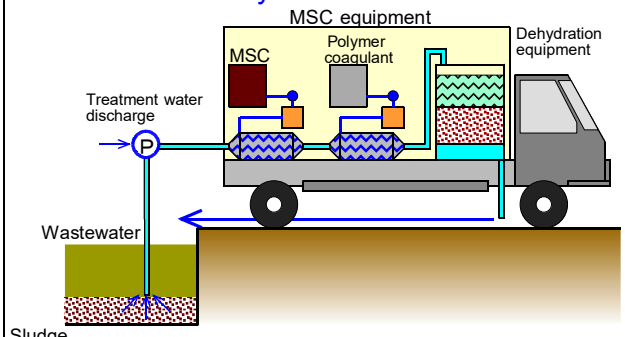


By line mixer arranged in a pipe, each agents are mixed together.

●Design of MSC double package dehydration method



In-vehicle MSC system

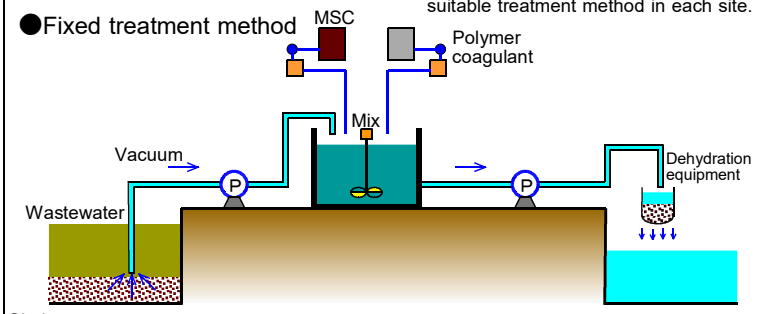


Design of in-vehicle MSC system

MSC method usage example

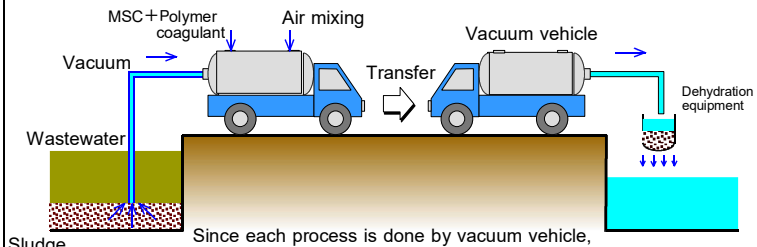
MSC method enables to conduct suitable treatment method in each site.

●Fixed treatment method



It is suitable for bottom sludge treatment in moats, city rivers, lakes, and channels since it is conducted in fixed plants.

●Movable treatment method



Since each process is done by vacuum vehicle, it's good at mobility. It's suitable for narrow place such as below grade pit sewer.

MSC Method Principle

①By adding MSC to bottom sludge or polluted water, absorbed water film is destroyed due to hydrophobing. Also, capillary water between soil particles is separated and becomes free water. Separated soil particles adsorb each other, thus become gritty particles.

②In adding polymer coagulant, the diameter of flock gets bigger, and it settles down very fast.

③Flocculated soil particles are not mixed with water again. As a result, supernatant water can directly drain. By filtering with permeable mats, the water is easy to be separated.

④Flocculated soil has large hydraulic conductivity by hydrophobing of soil particles. Thus, it enables to conduct efficient dehydration in bottom sludge. Moreover, because soil particles are absorbed each other without capillary water, the bonding structure is strong and has large consolidation strength. As a result, the soils can be used for banking as recycling.

The application of MSC method

MSC's high flocculent ability can treat fine suspended matters and harmful substances that traditional methods could not treat. In treated water and soils, there is no probability of secondary pollution or negative effect on Eco system, thus very safe method. This method can work for wastewater from various industries. By adding existing treatment facility, it can improve the function.

Suitable place for MSC

■Organic bottom sludge	■Food industry wastewater	■Polluted water from digging
■Industrial waste sludge	■Brewery wastewater	■Polluted water from tunnel
■Livestock waste sludge	■Cement plant wastewater	■Polluted water from road cutter
■Wastewater sludge	■Crushed stone wastewater	■Concrete wastewater
■Sewage sludge	■Chemical plant wastewater	■Bentonite wastewater

Recycle for MSC treated soils

From disposal to effective use.

MSC treated soils is fertile which soils contain rich fertilizer nutrients (phosphorus・nitrogen).

●Fruit farm	●Flowerbed soils	●Vegetable field soils
●Cultivated field	●Garden soils	●Planting soils

※In case that is doesn't contain harmful matters such as heavy metals.

■Manufacture

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